

**“TOGETHER, NOT ALONE:”  
HOW NASA’S JOURNEY TO MARS WILL BE  
DEFINED BY CROSS-SECTOR COLLABORATION**

**REMARKS TO AIAA SPACE 2016**

September 13, 2016

It’s great to be here with all of you – I’m excited to be able to help kick things off for you today and to be able to share the stage with Deputy Undersecretary Winston Beuchamp (*This Marine won’t hold his Air Force allegiances against him!!*)

It’s also a pleasure to join one of the great stars of the Venture Capital world, Steve Jurvetson.

I truly believe that it says something powerful that AIAA would choose to open this conference with a representative from Venture Capital, a representative from the Department of Defense and a representative of America’s civilian space agency.

In the days, months and years ahead, each and every one of us who are a part of the space exploration, space policy and space business communities have a choice to make. It’s a choice that human beings have

been making pretty much for as long as we've been looking up toward the heavens – and beyond.

It's actually a fairly simple choice – but don't let its simplicity distract you from its importance. The choice is this: *“Alone?” or “Together?”*

One of my favorite singers, Norah Jones, once said that making music is at once *“part social, part interaction, part collaboration.”*

The history of the space program suggests that the same can be said about human progress.

Someone who believes very strongly in the power of collaboration is my boss, President Barack Obama.

I would argue that when it comes to space exploration, he's set us on a visionary course; a journey that will take human beings to Mars in the 2030s, while taking humanity to ever greater heights, every single year.

For all the complexities involved in sending human beings to Mars in the 2030s, the fundamental underpinning strategic philosophy for completing this journey is simple: “together, not alone.”

**Together** with the private sector, we're building a commercial market in low-earth orbit.

**Together** with citizen scientists, entrepreneurs, engineers, academics, innovators and businesses, we're developing the technologies that drive exploration and will be necessary to get human beings to Mars.

**Together** with partners across the same diverse array of sectors and walks of life, we're developing spinoff technologies that are saving lives and improving our quality of life here on Earth.

**Together** with partners on every corner of our shrinking planet we're choosing to work in concert and collaboration, rather than in competition or contempt.

Over these next few days, you'll be hearing an awful lot about new technologies and the business opportunities that flow from them.

As you take everything in, I want to invite you to think of things against the backdrop of the future that will be possible if we continue the Journey, stay the course and choose “together” over “alone.”

With this in mind, I have a favorite exercise ... *Show of hands, do we have any parents or grandparents in the room? Ok, now keep your hands up if your kids or grandkids are age 15 or younger. Keep those hands up.*

I promise I'll let you put your hands down in a moment! But first I just want to make this one point: “the children and grandchildren of everyone whose hands are in the air have lived every day of their life – every single day – in times when human beings from different countries have been living and working together aboard the International Space Station (ISS) *(ok, feel free to put your hands down*

Just think about that for a moment. I believe the Space Station ought to win a Nobel Peace Prize. The facts are truly staggering: Tens of thousands of people from 15 different countries have been involved in its construction and operation.

Hundreds of human beings from 17 different countries have spent time on board. It's hosted 1,700 research investigations from more than 83 countries.

For this reason, the Station represents historic progress not only off the Earth, but right here at home on it.

The poet William James wrote more than a century ago that as human beings, quote "*We are like islands in the sea, separate on the surface but connected in the deep.*"

Humanity's common experience aboard the ISS has taught us that we are connected not only in the deepest depths of the sea, but also in the vastness of space – and everywhere in between.

This spring I had occasion to spend some time with my friend Scott Kelley and with his Russian counterpart Mikhail Kornienko (as I'm sure you know, they spent a year together in space.)

The strength of their bond and the success of the partnership between our two nation's space agencies is something that my friends in the State Department have asked me how they can emulate.

The story of the Space Station is also a story of partnerships among sectors: partnerships that span government-run space agencies, public elementary and secondary schools, public and private universities, Fortune 500 businesses, small startups, research institutions and so forth.

Chances are that as you walk down the halls here at *Space 2016* you'll bump into several people who are working in some way in support of NASA's efforts in support of the Station's operations.

If you look at NASA commercial space initiatives to transport crew and cargo to the Station, Americans are working at more than 1,000 companies across virtually every state in support of our efforts.

Meanwhile, as astronauts work above us "Off The Earth, For the Earth", people from all walks of life are working north, south, east and west of us to put Station-related research and technology to work for millions of people across the globe ...

They're improving eye surgery and purifying drinking water. They're finding new ways to protect the health of our environment *and* of our neighbors. They're figuring out how to make our communities more resilient when natural disasters strike. The scope and breadth of the work they are doing is as vast, as robust and as expansive as the very universe itself.

NASA's Journey to Mars is a Journey to a future world where our grandchildren's children look at a continuous human presence on Mars as a mere fact of life.

NASA's Journey to Mars is a journey to a future world where more Americans are working in STEM careers – and I include in this more women and more people of color. Because our nation's ability to reach our greatest potential is only as strong as each child's opportunity reach her or his own potential in God's eyes.

NASA's Journey to Mars is therefore also a journey to an American economy made stronger by the space-based operations of established

companies and startups alike; companies that will partner with NASA on the technologies that drive exploration and economic growth ... companies that will thrive in the emerging commercial market we've created in low Earth orbit.

It's a journey that is made possible by companies that will benefit from NASA's work to make launches more affordable and advance small satellite technologies like Nanosats.

NASA's Journey to Mars is also a journey to the future of the American kitchen table. When I imagine what my granddaughters' futures will be like, I see them sitting around their own tables, feeding their own children safer baby formula and cleaner water. I see them benefiting from the latest and greatest medical advances and watching footage on some as of yet unimagined media of American astronauts walking the face of Mars.

I see them living in a more peaceful and harmonious world, because our journey to deep space, is also a journey the deepest depths of human understanding, compassion, and love.



When Neil Armstrong, Buzz Aldrin and Michael Collins reached the moon, the Houston Chronicle described the feeling of joy, connection and jubilation here on Earth as such – and I quote – *“For a moment it seemed that all men were brothers ... Communist journalists congratulated American scientists. Israeli photographers beamed at Egyptian broadcasters. Brown hands grasped white ones and few eyes were dry ...”*

Just think of what it will be like when the first boot of an American astronaut graces Martian soil.

Just think of what it will be like, when and if, we receive an answer to the age-old question of whether human beings are alone in the universe.

The journey of which I speak is well underway and we at NASA not only want you to be a part of it, we need you and your colleagues to be a part of it.

We are closer to sending human beings to Mars today than anyone, anywhere, at anytime has a every been.

The successful launch of our *OSIRIS-REx* mission last Thursday evening represents a significant milestone on our journey.

Astronaut Jeff Williams setting a record for most days in space and Scott Kelly completing his one-year mission this past spring represent others.

Last month's successful test of the RS-25 engines that will propel our Space Launch System (or SLS) rocket – and with it our astronauts – to deep space was another major achievement. So too was June's test of the SLS rocket's boosters. The assembly of the *Orion* spacecraft's heat shield for the un-crewed EM-1 mission represented yet another sign that we're making real, tangible progress.

Frankly, not all the progress we're making is technological. A lot of it is also what I like to call "hearts and minds progress." Case in point, people don't smirk or laugh or look at you like you're from Mars yourself when you tell them that we're headed to the Red Planet. Less often are folks asking, "*Why aren't you doing things my way?*" or "*Is Mars the right destination?*" Rather, they're asking, "*How can we be a part of this?*" and "*What are some areas where we can work together?*"

We've made our plan for completing the Journey to Mars available for download at [NASA.gov/MARS](https://www.nasa.gov/MARS). If you take a look, I hope you'll agree that it's clear, it's affordable, it's sustainable and it's attainable.

I can tell you that we at NASA are seeing a new consensus emerge around it – whether you look at government, the scientific community, the private sectors and so forth.

Our plan focuses around three stages. We're currently in what we call the Earth Dependent Stage, where much of our work takes place aboard the International Space Station or ISS. Since the President and Congress extended the life of the ISS until at least 2024, investors in commercial activities can plan accordingly.

In the next decade we'll enter a Proving Ground stage in cis-lunar space, the area around the moon where our astronauts are days away from Earth, rather than hours. Frankly, we have big plans for you and your colleagues as we enter this stage. In the mid-2020s, as we transition much of our government-sponsored human exploration workforce from supporting the

Space Station to deep space missions, it's our hope – and our goal – that the commercial market which is emerging in low Earth orbit today, will become self-sustaining.

The idea is that NASA would facilitate this transition, following the pattern that's existed since the earliest days of the space program: NASA and private partners pioneer, develop and demonstrate new technologies and then we turn things over to the private sector while we move deeper into the next stages of exploration.

For those of you hoping to shape tomorrow's commercial market today, there are opportunities already underway. Our commercial cargo and crew initiatives are one example. Another is the recent Request for Information we released to solicit ideas on how the private sector might use an available docking port on the ISS. One of the potential uses of such a port would be preparation for a future private-sector station in low Earth orbit.

I want to be clear with you that our plans for cis-lunar space were designed with public-private partnerships in mind.

For starters we're going to be researching, developing and demonstrating all sorts of technologies for the first time in their intended environment. We're talking things like solar electric propulsion, habitats and so forth.

All of this will set the stage for the final, Earth Independent stage when our astronauts reach Mars in the 2030s. When it comes to space business and when it comes to the businesses of healing, leading and innovating here on Earth we are living the words of President Obama each and every day.

In response to his challenge, we are expanding further into space, and strengthening our leadership here on Earth. With all of you we want to continue to turn science fiction into science fact and make the impossible possible.

The President has set us on visionary course ... it's up to all of us to see it through beyond January and to choose to do it together, not alone.

Thank you all very much.